



# *ThermaViewer*<sup>TM</sup>

The Best Way to Look at Temperature

Installation Guide

Care and Use Guide



## **Congratulations!**

Your ThermaViewer is a high-quality instrument designed to give years of reliable service. It can be used with different types of sensors to monitor temperature and relative humidity.

### **Sensor Accuracy:**

The ThermaViewer display-unit logs and displays information that it retrieves from its sensors. The accuracy of the collected data displayed on the LCD and stored in the SRAM of the display unit is dependent on the sensors used to collect the data. Temperature sensors with accuracies of  $\sim\pm 1^{\circ}\text{C}$ ,  $\pm 0.3^{\circ}\text{C}$ ,  $\pm 0.2^{\circ}\text{C}$ ,  $\pm 0.1^{\circ}\text{C}$  are available. Relative Humidity sensors are accurate to  $\pm 2.0\%$  except at the extreme ranges where the accuracy is less than 2%.

### **Power:**

All ThermaViewers are powered with a power adaptor, which plugs into a wall socket and supplies 12volt 500mA current to the ThermaViewer display unit. Each ThermaViewer also has a 9vdc battery that will continue to operate the ThermaViewer during power failures. The 9-volt battery should operate the ThermaViewer for at least 48 hours if it is fully charged.

The LCD display will automatically go to sleep after 20 seconds any time the normal (120-volt) power is interrupted. Having the display off increases the amount of time the unit will continue to operate on the battery.

If wall power is missing, the power light, which normally glows a bright green, will glow very faintly. This is an indication that the unit is still collecting data and is being powered by the 9vdc batter. If the 'Missing AC alarm' is activated the internal buzzer will beep in 1 second intervals.

During a power outage the user can verify that the unit is collecting data by pressing the 'ENT' key. This will wake up the display for 20 seconds so that the chart can be seen. Repeatedly pressing the 'ENT' key will put a large drain on the 9vdc battery and shorten its life. (If wall power is present the 9vdc battery is trickle charged to keep it fully charged).

### **Internal Alarm & Relay:**

The ThermaViewer has a relay and piezo buzzer that will be triggered if the user-set alarm conditions are met. The relay is a dry-contact normally open (N/O) relay that can be factory set to supply 12vdc as an option.

## **Factory Service and Returns:**

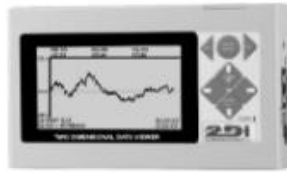
Please call for a return authorization (RA) prior to sending any instrument for repairs. (see page 33 for warranty information).



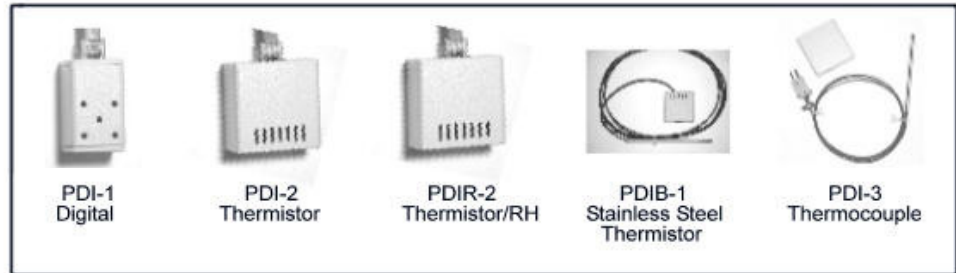
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## Components and Packing List



ThermaViewer  
Display Module



PDI-1  
Digital

PDI-2  
Thermistor

PDIR-2  
Thermistor/RH

PDIB-1  
Stainless Steel  
Thermistor

PDI-3  
Thermocouple

### ThermaViewer Probes



20 foot  
Sensor Cable



10 foot  
PC Cable



ThermaViewer  
AC adaptor



AC adaptor for  
& Auto Dialer



Battery



Optional  
Auto Dialer

Your ThermaViewer should have come with a display module (LCD), one or two sensors, (PDI-1, PDI-2, PDIR-2, PDIB-1 or PDI-3), one or two sensor wires, a PC interface cable, a DVD, an AC power adaptor, and a 9vdc backup battery.

***If any of these items are missing please contact the factory or the distributor/reseller from whom you ordered the ThermaViewer immediately.***

The PC download software can be copied from the DVD, or downloaded from our web site at: [http://www.e2di.com/PC-software/PC\\_software.html](http://www.e2di.com/PC-software/PC_software.html)

You will be asked for a user name and password.

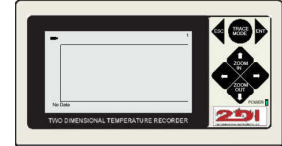
Username: 2di

Password: 6901



## Quick Start

Your ThermaViewer can be installed and operating in minutes. Once you have unpacked all ThermaViewer components, follow the simple steps below:



you

1. **Remove the protective film on the display.**
2. **Connect the power supply.** Insert the adaptor plug into a wall socket. After a three second delay the system parameter screen will appear (see illustration two below).
3. **Select language and date parameters.** The cursor will be positioned at the Language prompt. Select a language (English, French or Spanish) with the **UP** arrow key and press **'ENT'**.
4. **Select C° or F°** and press **'ENT'**.
5. **Select the date format** (MM/DD/YY, DD/MM/YY or YY/MM/DD) and press **'ENT'**.
6. **Set the day, month, year, hour and minute** in each field using the **UP** and **DOWN** arrow keys. Move to the next field with the **'ENT'** key. (**Note:** you can move to each field with the **'Right Arrow'** key but your changes will not be recorded properly).
7. Press the **'ESC'** key twice to return to the chart display screen. (**Note:** you do not need to access any of the other fields at this time).
8. Gently **pull out the thin plastic strip** at the upper left side of the display unit.

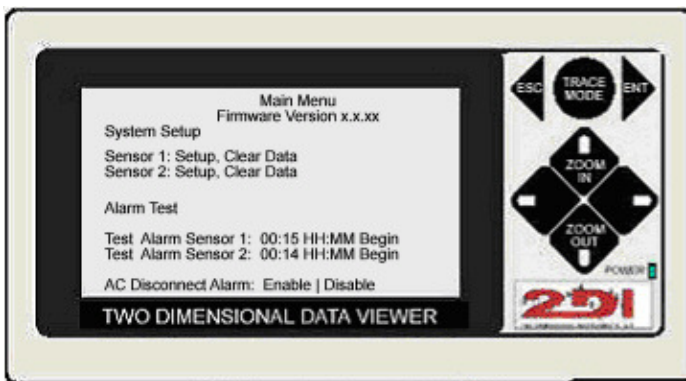
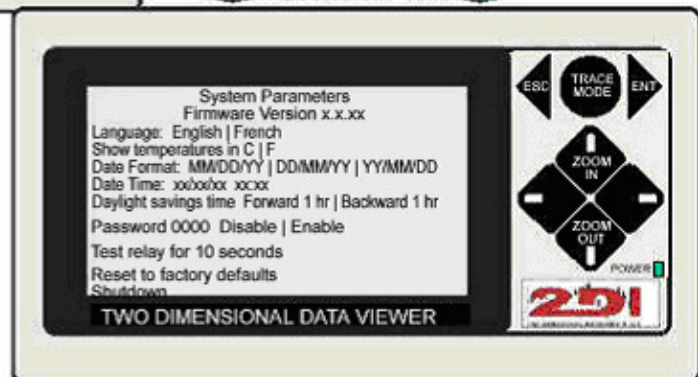
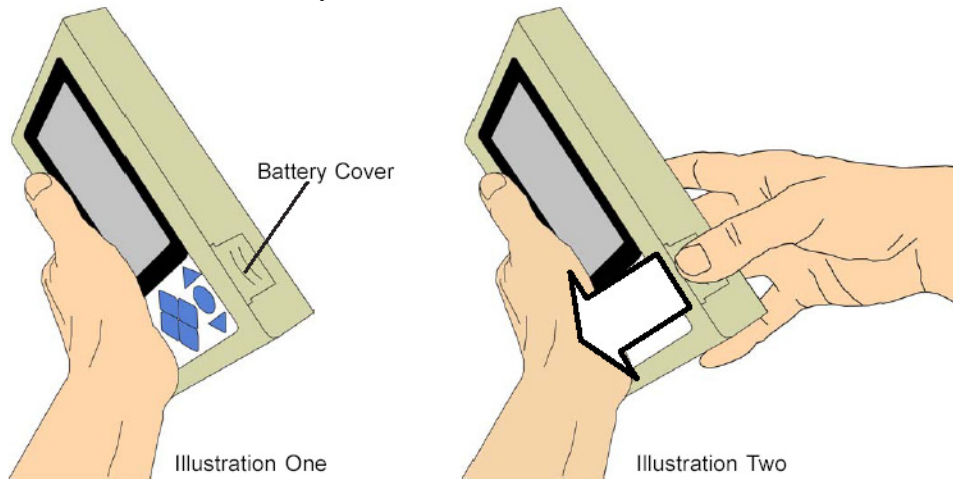


Illustration One

Illustration Two

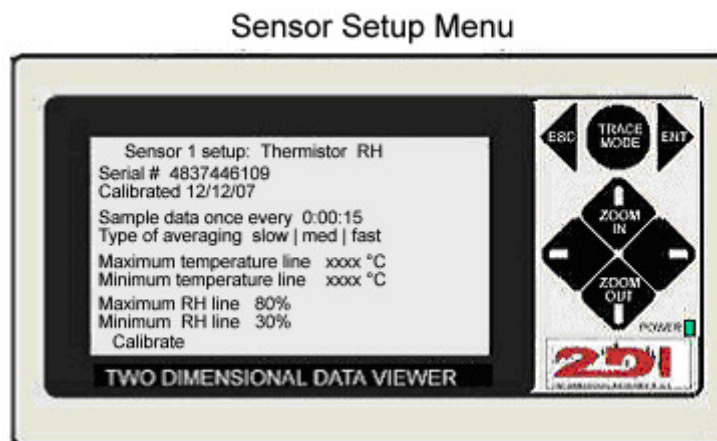


- 9. Install the 9vdc battery.** Slide the battery cover on the top of the ThermaViewer forward to remove it. Retrieve the battery wiring harness and attach it to the battery. Insert the battery into the unit and reinstall the battery cover.



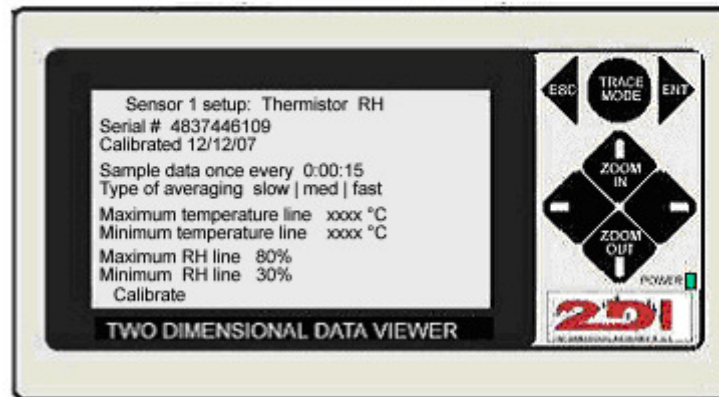
**Operational Tip:** *Never replace the battery with the wall-power supply disconnected or allow the battery to completely discharge, as data loss will occur.*

- 10. Attach the sensors**



**Operational Tip:** *Although you may plug in both sensors at the same time we recommend that you plug in one sensor and configure it, and then plug in the second sensor and configure it. The settings that follow must be set for each sensor.*

### Sensor Setup Menu



When a sensor is attached the Sensor Setup menu will appear after 5 seconds..



**Operational Tip:** The **UP** and **DOWN** arrow keys are used to scroll through possible setting in each data field. Once you select a value, press the **'ENT'** key to enter it.

- A. **Enter the sample interval.** (This is, of course, how often you want the ThermaViewer to take and store a temperature). Select a value between 5 seconds and 24 hours. Press **'ENT'**.
- B. **Enter the type of averaging** and press **ENT**. There are three possible selections.
  - a. **Fast** – no averaging occurs. The exact measurement at the time of sampling will be stored and displayed. (Not normally used)
  - b. **Medium**- some averaging will take place so that minor temperature fluctuations will be filtered out. (This is the default value).
  - c. **Slow** – additional averaging will occur. This will filter out temperature fluctuations. (Not normally used).
- C. **Set the Maximum and Minimum temperature lines.** These are the limits of the displayed chart. They are not the limits of the temperatures that can be collected but they are simply the upper and lower display limits of the chart that shows on the display. Temperatures that fall outside these limits will appear as a straight line at the top and bottom lines of the chart. Press **'ENT'** after each setting.
- D. **Set the Maximum and Minimum lines for the RH chart.** (You will not see these settings unless you have attached a sensor that captures humidity readings.) Press **'ENT'** after you have entered each setting.
- E. You do not need to enter the Calibration Menu at this time.
- F. Press **'ESC'** to return to the display screen.

## **Installation tips**

1. **Planning** - Position the ThermaViewer display unit within ten-feet of an AC power source. A U.S.-style 120vac adaptor is supplied with the ThermaViewer. *(For international locations a switching power supply should be ordered as a separate item.)*
2. **Temperature Sensors and Cables** - The ThermaViewer is normally shipped with a 20-foot wire for each sensor. If this is not adequate, longer wires are available.
3. **PC Interface Cable** - The ten-foot cable with a nine-pin (DB9) connector on one end and a stereo plug on the other is used to download data from the ThermaViewer to a computer. The nine-pin connector is compatible with a computer serial port (i.e. COM1, COM2, etc...) *(If your computer only has a USB port you will need a USB to Serial converter).* If the ThermaViewer is not located near a computer it can be unplugged (insure that the 9vdc battery is fully charged first) and walked over to a computer for downloading.
4. **Backup Battery** - A backup 9vdc battery provides temporary backup power during a power outage. If a power outage occurs, the display will go to sleep after 20 seconds to decrease the load on the battery. A fully charged battery will operate the ThermaViewer in sleep mode for ~ 48 hours, depending on how often you are sampling data. While the display is asleep pressing 'ENT' will 'wake' it up for 20 seconds.

Frequent power outages can quickly drain the 9vdc battery. The small icon in the upper left hand corner of the display indicates the remaining battery life. If the icon is less than ½ full the 9vdc battery should be replaced.

If the battery voltage drops below 6 volts the screen will sleep and cannot be awakened even with the reset switch. In this case:

- a. Wall power must be supplied
- b. A new battery inserted
- c. The reset switch pressed.

The 9vdc battery can be changed by pressing in and pushing forward on the battery door. (see page 6 of this guide). Snap a new battery onto the red and black wire connector and replace the battery door.

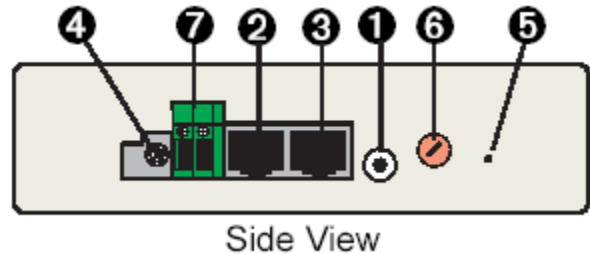
**Operational Tip:** *If the wall power is interrupted, the green power light on the front of the ThermaViewer will dim so that only a faint glow is evident, the missing AC alarm will begin beeping (if set) and the display will sleep after 20 seconds. Once wall power is restored, the green power light will be fully illuminated and the display will 'wake-up'.*





## Power, Sensors, and Data Connections

1. **PC Interface** - PC interface cable socket for downloading data. This accepts the PC download cable with the 9-pin plug on the other end.
2. **Sensor one socket** (closest to the green relay)
3. **Sensor two socket** (closest to the top of the unit).
4. **Power Receptacle** - Wall adapter supplies 12vac 500mA *or* 12vdc 500mA. If you supply your own power source the polarity can be either + center or – center.
5. **Reset Switch** - The reset switch may be pushed with a straightened-out paper clip to correct the following problems.
  - a. If the ThermaViewer is unplugged from wall power and the 9vdc battery is allowed to discharge below 6 volts, the display may not wake up when wall power is restored or a new 9vdc batter is inserted. Replace or remove the 9vdc battery first before pressing the reset switch.
  - b. If a power spike occurs it may ‘scramble’ the displayed data.
6. **Contrast Control** - The LCD contrast may be adjusted using a small flat bladed screwdriver.
7. **Relay** - This relay has two parts. One part is permanently affixed to the board inside the ThermaViewer. The other part can be unplugged by pulling toward the operator for easier access.



The screw-type connectors should be tightened down on the wire that connects an alarm or auto dialer to the relay to insure a good connection.

The relay is a dry-contact relay, but can be factory configured to supply 12vdc power with the positive pole closest to the power supply. It is protected by a 0.5 amp fuse, so should never be exposed to more than 1/2 of an amp (100 mA) current.



**Operational Tip:** Pressing “ESC” will turn off the buzzer and open the relay if an alarm condition occurs.

## User Controls

The ThermaViewer is equipped with seven buttons for User Controls, which the user pushes to interface with the ThermaViewer. Each of the seven buttons performs some function depending on which mode or menu is active (see page 14 for an explanation of the modes).

For example, if the cursor is positioned over a temperature setting on a menu you push the **UP** arrow button to increase the temperature. Continually pushing the **'UP'** arrow button causes the setting to scroll much faster. If you continue to hold the button after the first speed increase, the scroll rate will speed up again so that you are scrolling through 10 numbers at a time.

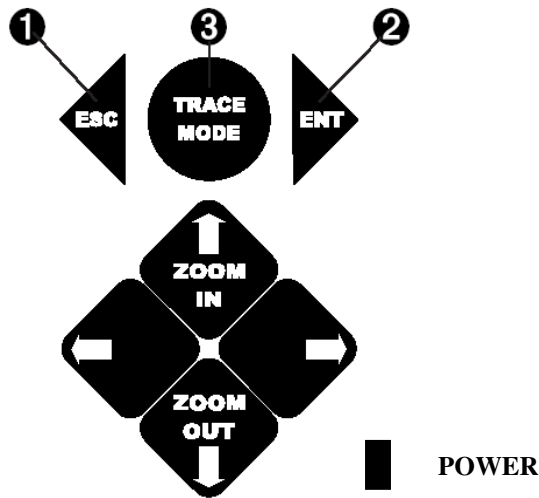
*i.e. If you are trying to enter 200°C as the maximum chart display line on the sensor 1 menu, you could either push the **UP** arrow button 200 times or you can hold down the button for several seconds while the temperature scrolls to 200°.*

*Likewise if you are trying to enter 2000° continue to hold down the button until the temperature begins to scroll much more rapidly. As you continue to hold down the button the temperature setting will begin to scroll 10 degrees at a time.*

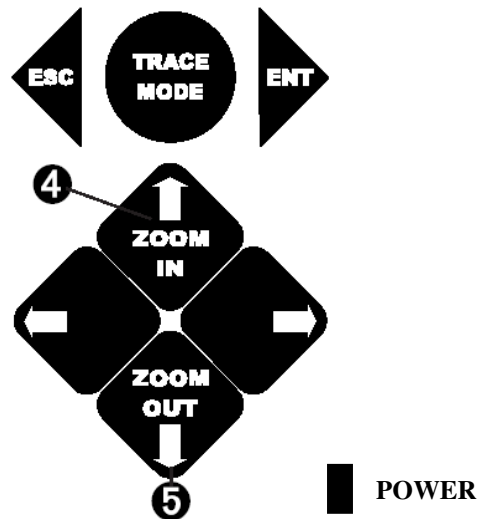
Each button performs multiple functions depending on what is displayed on the screen. These are explained in detail on the pages that follow.



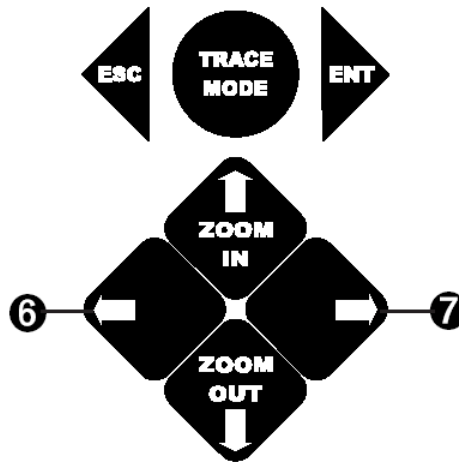
**Operational Tip:** *Holding down the 'UP ARROW' or "DOWN ARROW" button causes it to speed up the scroll rate.*



1. The **ESC** key performs several functions depending on the ThermaViewer mode.
  - a. In the *Active Mode* the **ESC** key toggles the display mode between different displays.
  - b. In the *Menu Mode* the **ESC** key exits the current menu, going to the preceding one.
  - c. In the *Trace Mode*, the **ESC** key exits the *Trace Mode*.
  - d. In the *Sleep Mode* the **ESC** key is inoperable and does nothing.
  - e. During an *Alarm* condition the **ESC** key will shut off the alarm and open the relay.
  
2. The **ENT** key performs several functions depending on the ThermaViewer mode.
  - a. In the *Active Mode* the **ENT** key causes the unit to enter the Menu Mode.
  - b. In the *Menu Mode*, the **ENT** key moves the cursor to the next field **and saves** the setting just entered.
  - c. In the *Trace Mode* the **ENT** key enters the menu system.
  - d. In the *Sleep Mode* the **ENT** key awakens the display for 20 seconds.
  
3. The **TRACE MODE** key is only active during the *Active Mode*.
  - a. In the *Active Mode* the **TRACE MODE** key enters the *Trace Mode*.
  - b. In the *Menu Mode* the **TRACE MODE** is disabled.
  - c. In the *Trace Mode* the **TRACE MODE** is disabled.
  - d. In the *Sleep Mode* the **TRACE MODE** is disabled.



4. **UP** arrow or **ZOOM-IN** key
  - a. In the *Active mode* the **UP** arrow zooms into displayed data causing the amount of displayed data to be cut in half. For example, if the current chart was showing 9 days and the **UP** arrow key is pushed once the chart will show 4.5 days (See FAQ on page 30 for more information).
  - b. In the *Menu Mode* the **UP** arrow scrolls through choices for a highlighted field.
  - c. In the *Sleep mode* the **UP** arrow is disabled.
  
5. **DOWN** arrow or **ZOOM-OUT** key
  - a. In the *Active Mode* the **DOWN** arrow doubles the amount of displayed data when pressed. For example, if the current chart was showing 9 days and the **DOWN** arrow key is pushed once the chart will show 18 days . (see FAQ on page 30 for more information).
  - b. In the *Menu Mode* the **DOWN** arrow scrolls through choices for a highlighted field.
  - c. In the *Sleep mode* the **DOWN** arrow is disabled.



#### 6. **LEFT** arrow key

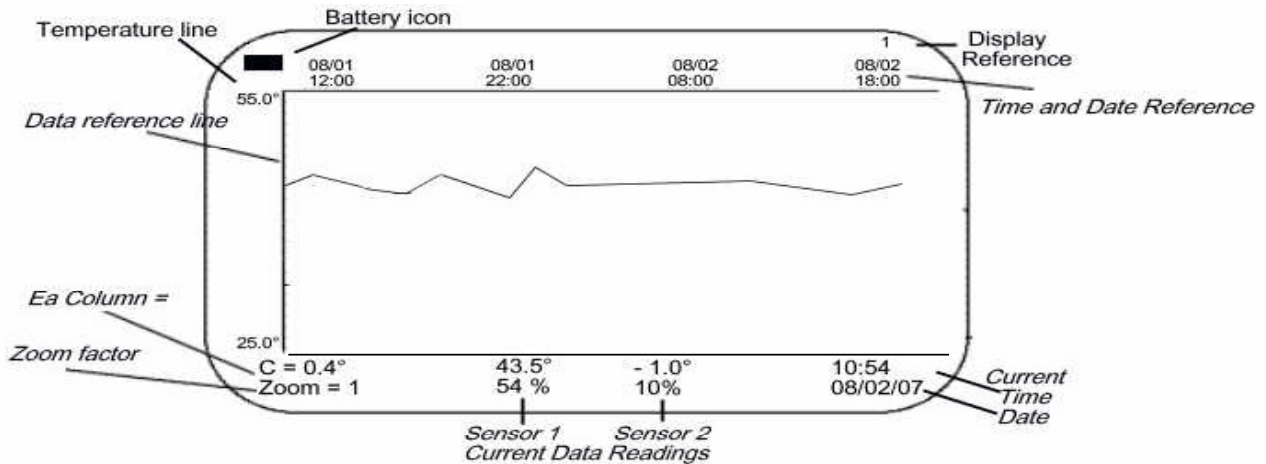
- a. In *Active Mode* the **LEFT** arrow scrolls one screen to the left, displaying older data.
- b. In the *Menu Mode* **LEFT** arrow moves the cursor to the preceding field. **Note:** The entry is not saved. If you have changed the value displayed in a field, pressing the **LEFT** arrow will move the cursor to the next field but the changed value will not be saved. To save the changed value use the **ENT** key to move to the next field.
- c. In the *Sleep Mode* the **LEFT** arrow is disabled.
- d. In the *Trace Mode*, pushing the **LEFT** arrow key causes the vertical line on the display to move to the left and highlight a different measurement.

#### 7. **RIGHT** arrow key

- a. In the *Active Mode* the **RIGHT** arrow scrolls one screen to the right showing newer data.
- b. In the *Menu Mode* the **RIGHT** arrow causes the cursor to move to the next field. **Note:** The entry is not saved. If you have changed the value displayed in a field, pressing the **RIGHT** arrow will move the cursor to the next field but the changed value will not be saved. To save the changed value use the **ENT** key to move to the next field.
- c. In the *Sleep Mode* the **RIGHT** arrow is disabled.
- d. In the *Trace Mode*, pushing the **RIGHT** arrow key causes the vertical line on the display to move to the right and highlight a different measurement.

## Operational Modes

The ThermaViewer has four operational modes: *Active; Menu; Sleep; and Trace.*



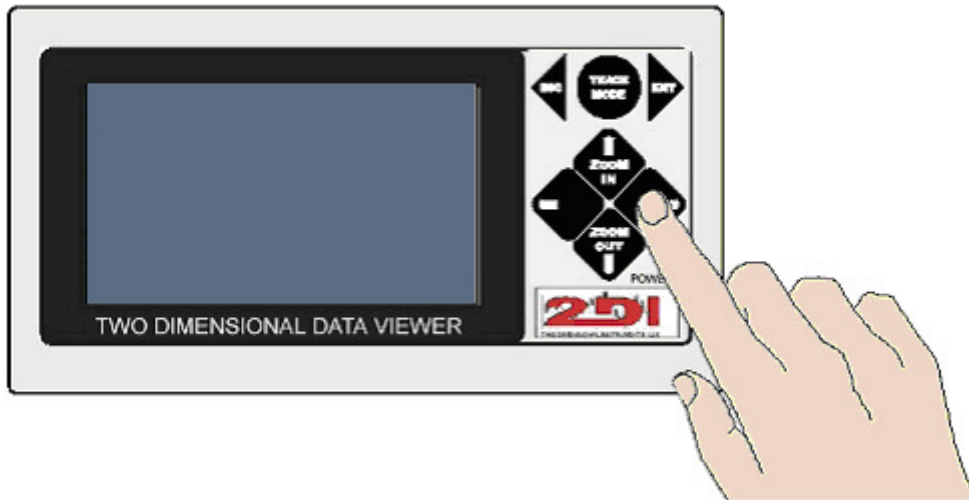
### *Active Mode*

1. A chart is displayed on the LCD.
2. The temperature line is the Maximum temperature displayed on the chart and can be set in each Sensor's Setup Menu. (There could be recorded temperatures above this line).
3. The Battery Icon indicates the amount of charge in the 9-volt battery. The battery should be replaced at least annually or whenever the icon shows ½ full. The display will begin to blink when the battery is in danger of being fully discharged and therefore not capable of protecting your data.
4. The display reference shows the sensor number and variable being monitored (i.e. 1T for temperature sensor #1, 2T for temperature sensor #2, 1RH for humidity sensor #1, 2RH for humidity sensor #2).
5. The time and date reference lines refer to the date and time the data was recorded.
6. The bottom two rows of the display show the chart legend, the current sensors readings along with the current date and time. (See FAQ on page 30 for an explanation of the Zoom feature)



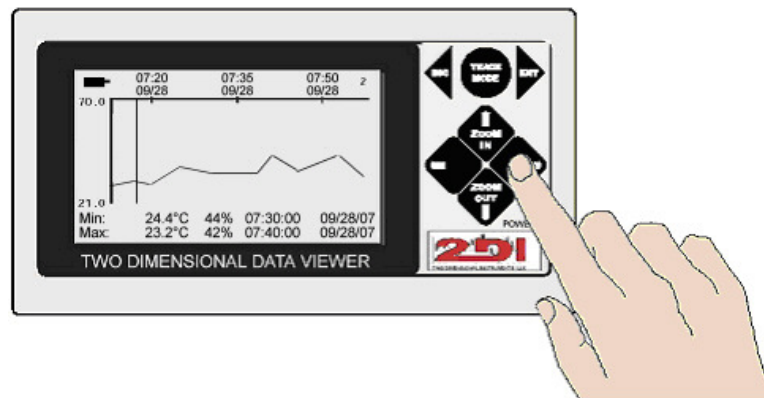
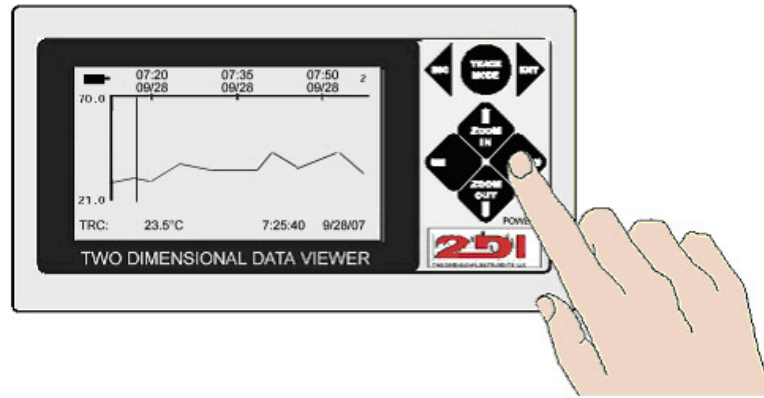
**Note:** *Newly collected data rolls over older data so that only the latest measurements for each sensor are displayed and stored in the ThermaViewer. If you are sampling data every 10 minutes the last 1.5 years of data will be stored and can be viewed.*

## *Sleep Mode*



1. In the *Sleep Mode* the display (LCD) is asleep (blank). The ThermaViewer automatically enters this mode if wall-power is missing for 20 seconds to conserve your data and maximize the time the 9vdc battery will continue to operate the system. *The ThermaViewer will still collect data during the sleep mode* and the display can be ‘awakened’ for twenty seconds by pressing the **ENT** key.
2. Only the **ENT** button is active in this mode. None of the other buttons will respond in the sleep mode. If the display is left asleep the 9vdc battery will continue to power the ThermaViewer for several hours (up to 48 hours depending on the user settings).
3. Alarms will still be triggered during the sleep mode and any visual warnings will display while active.

## Trace Mode



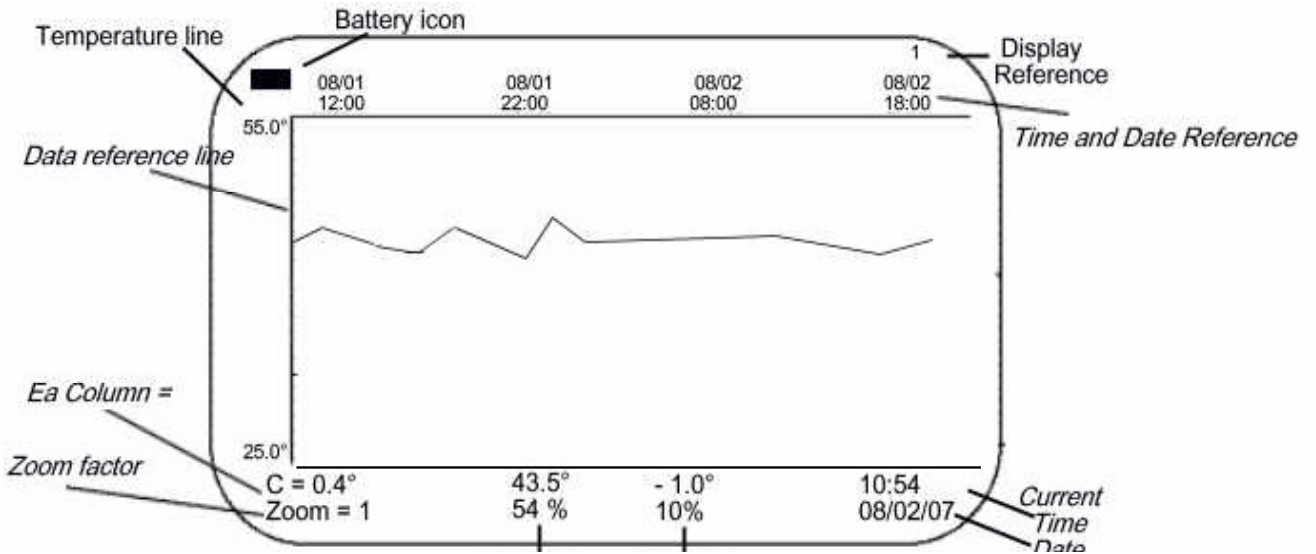
1. *Trace Mode* allows the user to see the recorded temperature with the time they were recorded. When ‘**TRACE MODE**’ is pressed a vertical line appears on the display. The **LEFT** and **RIGHT** arrow keys will move the vertical line left or right to display recorded temperatures and the times they were recorded. The recorded temperatures are shown on the bottom of the display along with the times they were recorded.

There are two different modes in the Trace Mode.

- a. Zoom = 1X (see top photo above) the temperature indicated by the vertical line will be shown along with the day and time that the temperature was recorded, on the bottom line of the display.
- b. If the display is zoomed out to Zoom=2X (see bottom photo above) or more, the maximum, and minimum temperature displayed in the column indicated by the vertical line will be shown with the date and time each was recorded. (See FAQ on page 30 for more information).



**Viewing the chart on the LCD display**



**Display Reference (upper right corner of the display)**

The small letter and/or number in the upper right hand corner of the LCD indicates what data is being displayed.

To change the display, press the **ESC** key. The display will cycle through each possible display showing different data each time.

| Display Reference | What is being shown                          |
|-------------------|--|
| 1                 | Sensor 1–temperature or temperature/RH chart |
| 2                 | Sensor 2–temperature or temperature/RH chart |
| T1                | Sensor 1 – temperature chart                 |
| T2                | Sensor 2 – temperature chart                 |
| H1                | Sensor 1 – humidity chart                    |
| H2                | Sensor 2 – humidity chart                    |

## Menu mode

### Main menu and system parameter menu

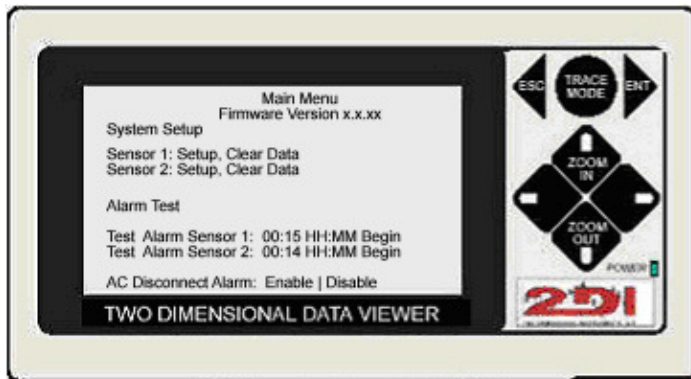
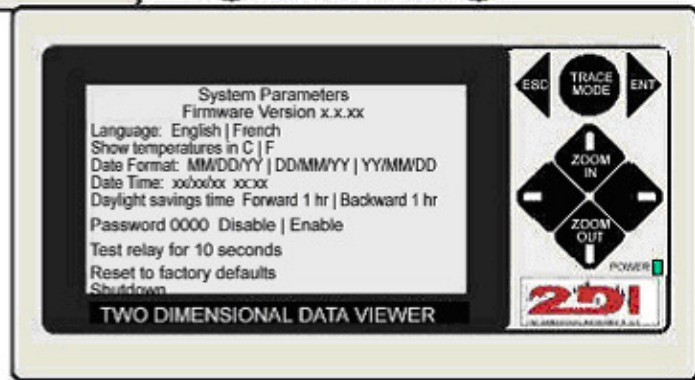


Illustration Two



| <b>Main Menu<br/>Firmware Version x.x.xx</b> |  |
|--|--|
| <i>Field</i>                                 | <i>Result of selecting</i>                                   |
| System Setup                                 | Opens the System Parameter Menu                              |
| Sensor 1: Setup                              | Opens the setup menu for #1 sensor                           |
| Sensor 2: Setup                              | Opens the setup menu for #2 sensor                           |
| Sensor 1 Clear Data                          | Clears stored data from sensor 1.                            |
| Sensor 2 Clear Data                          | Clears stored data from sensor 2.                            |
| Alarm Setup                                  | Opens the Alarm settings menu                                |
| Test Alarm Sensor 1 00:00 mm:ss Begin        | Puts a "T" and a "t" on the #1 sensor chart, indicating test |
| Test Alarm Sensor 2 00:00 mm:ss Begin        | Puts a "T" and a "t" on the #2 sensor chart, indicating test |
| AC Disconnect Alarm                          | If AC power is missing this alarm will sound                 |

*System Parameters*

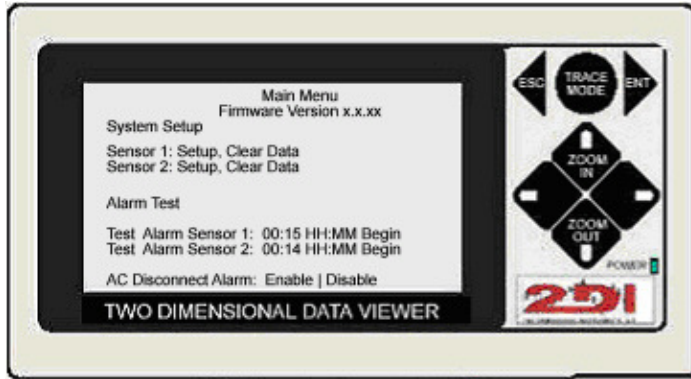
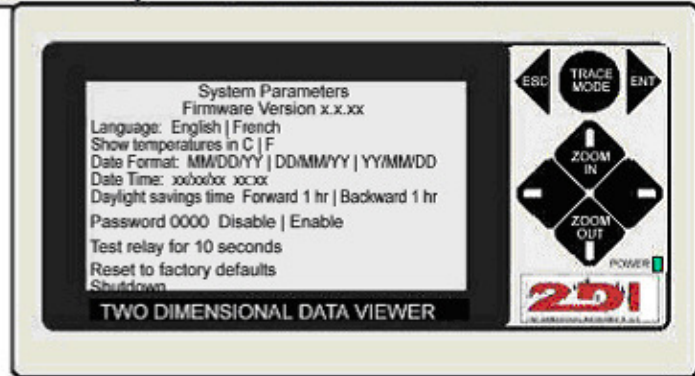


Illustration Two



| System Parameters<br>Firmware Version x.x.xx |                                   |   |
|--|-----------------------------------|---|
| <i>Setting</i>                               | <i>Choice</i>                     | <i>Impact on ThermaViewer Operation</i> |
| Language                                     | English   French   Spanish        | Affects all menus and displays          |
| Show temperature in                          | C   F                             | Affects all menus and displays          |
| Date Format                                  | mm/dd/yy   dd/mm/yy   yy/mm/dd    | Affects all menus and displays          |
| Date Time:                                   | xx/xx/xx    xx:xx                 | Sets the system clock                   |
| Daylight Savings time                        | Forward 1 hr   backward 1 hr      | Used to adjust clock 1 hr.              |
| Password                                     | 0000    Enable   disable          | Locks menu system                       |
| Test relay for 10 sec                        | (Highlight and press <b>ENT</b> ) | Closes relay and sounds the buzzer      |
| Reset to factory defaults                    | (Highlight and press <b>ENT</b> ) | Resets all menu settings to default     |
| Shutdown                                     | (Highlight and press <b>ENT</b> ) | To change battery if AC is absent       |



**Operational Tip:** *In order for a change to take effect, the ENT key must be pressed.*

## Sensor Setup Menu

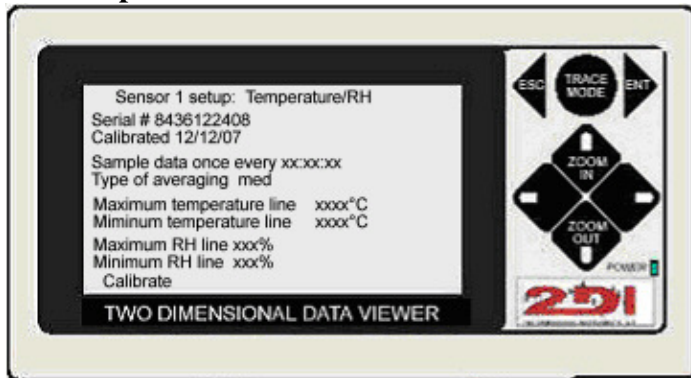
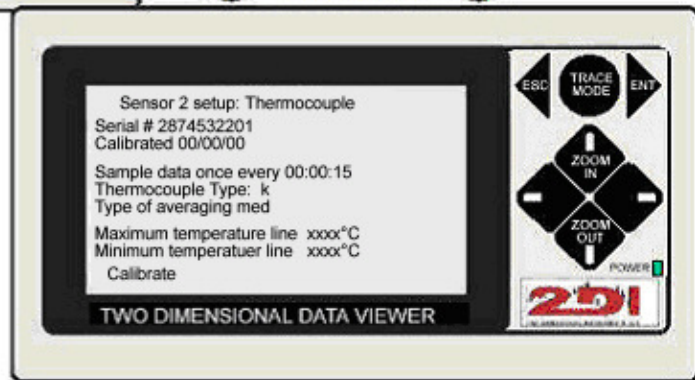


Illustration Three

Illustration Four



The sensor setup menu will reflect the type of sensor being used to record data. It may look like illustration three or illustration four above or even different than either, depending on the type of sensors being used. If a temperature sensor is used its setup menu will look similar to illustration four above. If a temperature/humidity sensor is being used the menu will look like illustration three above. If a thermocouple is attached its setup menu will look similar to illustration four above.

| Sensor X Setup: Temperature   temperature/RH |                       |   |
|--|-----------------------|---|
| Setting                                      | Choice                | Impact on ThermaViewer Operation                      |
| Sample data once every                       | xx:xx:xx (hr:min:sec) | How often to store a measurement                      |
| Type of averaging                            | fast   med   slow     | Sets the type of averaging ( <i>see B on page 7</i> ) |
| Maximum Temperature line                     | xxxx°C (or F)         | Sets the top line on the display chart                |
| Minimum Temperature line                     | (-) xxx°C (or F)      | Sets the bottom line on the display chart             |
| Maximum RH line                              | xx%                   | Sets the top line on display chart for RH             |
| Minimum RH line                              | xx%                   | Sets the bottom line on display chart for RH          |



**Operational Tip:** Changing the sample rate or type of sensor will cause any data already collected and stored in RAM memory to be erased.

Alarm Menu

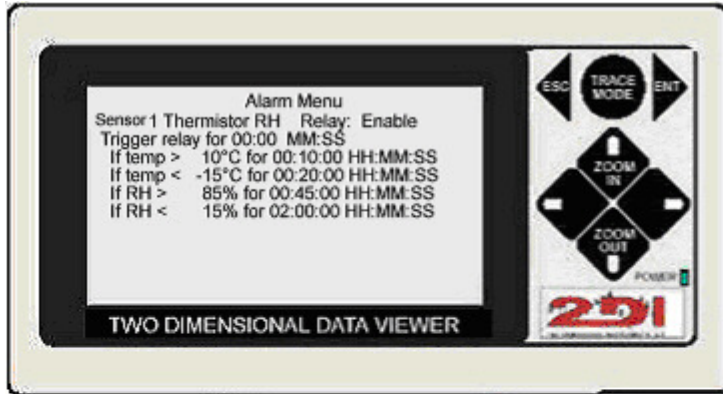
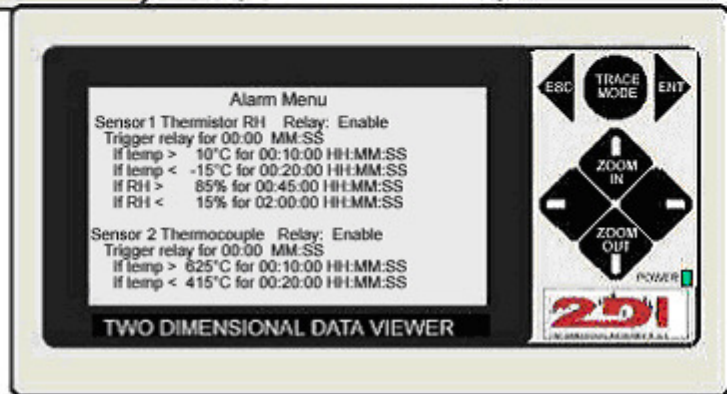


Illustration Seven

Illustration Eight



The alarm menu on your system could look like illustration seven or illustration eight above depending on the type and number of sensors collecting data.

| Alarm Menu  |                  |  |
|-------------|------------------|--|
| Setting     | Choice           | Impact on ThermaViewer Operation                             |
| Relay       | Enable   Disable | Enables or disables the alarm settings that follow           |
| 00:00       | MM:SS            | Duration of buzzer and relay closure (00:00 for indefinite)  |
| If temp > ° | Temperature      | High temperature trigger point                               |
| xx:xx:xx    | HR:MM:SS         | How long the temperature must remain before triggering alarm |
| If temp < ° | Temperature      | Low temperature trigger point                                |
| xx:xx:xx    | HR:MM:SS         | How long the temperature must remain before triggering alarm |
| If RH > %   | Humidity         | High humidity trigger point                                  |
| xx:xx:xx    | HR:MM:SS         | How long the RH must remain before triggering alarm          |
| If RH < %   | Humidity         | Low humidity trigger point                                   |
| xx:xx:xx    | HR:MM:SS         | How long the RH must remain before triggering alarm          |



**Operational Tip:** Leave the Trigger Relay setting at 00:00 to have the alarm continue to sound until manually shut off by pressing the ESC key.



The alarm is triggered once the measurement has moved outside the 'safe' zone for the set period of time, as defined by the user in the alarm setup menu. The clock that controls the alarm is different than the one that controls the logging of data. You could get an alarm and see an 'A' and 'a' on the chart display but you may not see a high temperature recorded on the chart if the data store rate is less frequent than the alarm interval.

For example: If you are storing a temperature every 10 minutes but have the alarm set to go off if the temperature rises above 50° for more than 1 minute, by looking at the chart you will not see a temperature above 50° if the temperature quickly rose above 50° and then rapidly dropped back down below 50°. In this case the temperature you are storing every 10 minutes is an average of all the temperature collected during that 10-minute time frame and if the temperature was above 50° for only a few seconds it would be averaged in with all of the other lower temperatures taken during the 10-minute period.

Once triggered, the alarm will stay on until one of the following conditions occurs:

- 1) A single measurement is taken that is within the safe parameters. At this point, the alarm timer resets so that the alarm condition must be violated for the amount of time specified in the alarm menu again before the alarm is triggered again. Note Even a single measurement that is taken once the min/max temperature is violated will cause a timer reset.
- 2) The user pressed the ESC key. At this point, the relay is opened, and the alarm timer is reset. So for example, if the alarm is set to trigger when the temperature rises above 35° degrees for 30 minutes and the temperature rises above 35° degrees for 30 minutes the alarm will sound and the relay close. Then the user silences the alarm by pressing the ESC button. The timer is now reset to 30 minutes. Only if the temperature remains or again rises above 35° degrees for another 30 minutes, the alarm will be triggered once more.
- 3) The alarm trigger timer expires. Once again, assume that an alarm condition is set to trigger for 10 minutes when the temperature rises above 35° for 30 minutes. If once an alarm is triggered the temperature never drops below 35°, so the alarm will sound for 10 minutes and then shut off. It will then be another 30 minutes before the alarm will be triggered again.



**Operational Tip:** *If you are monitoring a place or piece of equipment that has frequent temperature or humidity fluctuations let the ThermaViewer collect data over a two or three day period before setting the alarm. You will be able to see temperature spikes and/or valleys due to door opening or compressor operation, etc... and can set the delay time on the alarm so that the alarm will not be triggered by these normal events. Setting this delay time properly will eliminate false alarms.*

Calibration Menu

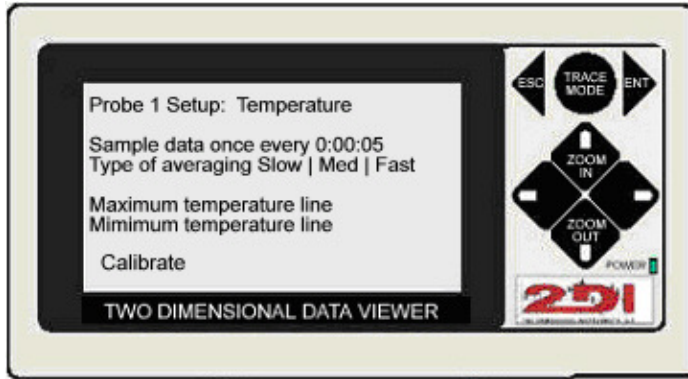
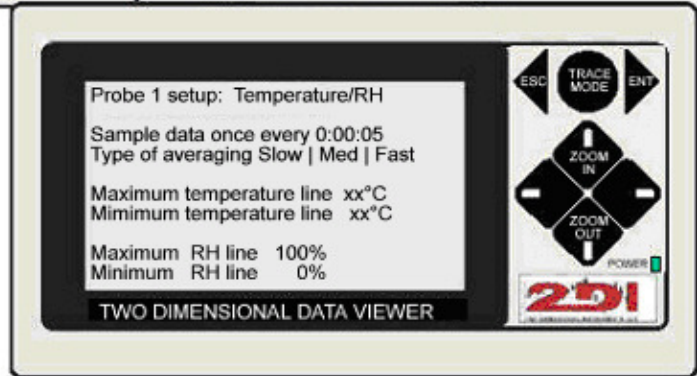


Illustration Five

Illustration Six



| Calibration Menu:           |                         |                                     |
|-----------------------------|-------------------------|-------------------------------------|
| Setting                     | Choice                  | Impact on ThermaViewer Operation    |
| Add another point Temp RH   | Highlight and press ENT | Allow the input of calibration data |
| Ser # xxxxxxxx Cal mm/dd/yy |                         |                                     |

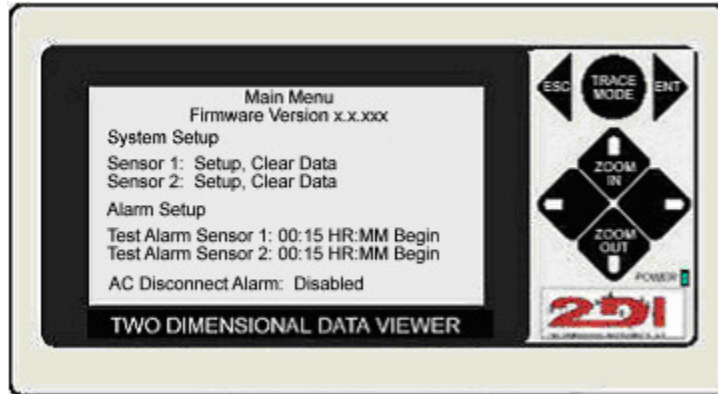
Calibration data is stored on the sensor (identified by its serial number) and may consist of :

1. One point – Every measurement will be corrected for difference between the measured value and the actual or standard value
2. Two Points – Any measurement will be adjusted by the offset equal to the point on a line drawn between the two points.
3. Three Points – Any measurement above the middle point will be offset equal to the point on a line drawn between the middle point and the upper point. Any measurement below the middle point will be offset equal to the point on a line drawn between the middle point and the lower point.

*(Suggested calibration procedures can be downloaded from the support page on our web site or the disc that came with the ThermaViewer)*

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 (877) 241-0042 • (502) 243-0039 fax • (502) 243-0042 international

*Additional Settings on the Main Menu*



Clear Data – This setting will clear all of the stored data for a particular sensor. You will receive a warning message and be required to select YES before the data is actually cleared from memory, but once it is cleared it is gone and cannot be recovered. It is a good idea to download data before clearing it out of the RAM memory of the ThermaViewer.

Test Alarm Sensor 1: xx:xx mm:ss Begin – This places a “T” on the chart indicating that a test is being conducted. When the test concludes after the allotted time a small “t” will be placed on the displayed chart to indicate that the test is over. The default is for the test or run for 15 minutes but you can set it to any duration up to 23 hours and 59 minutes

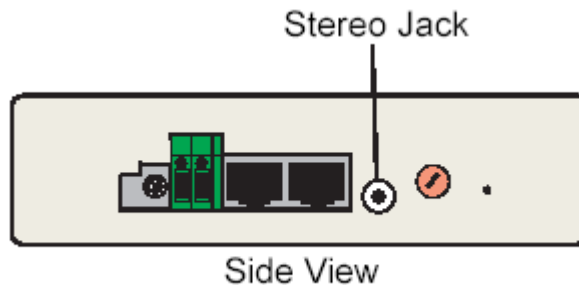
The purpose of this is to allow the user to trigger the alarm by raising or lowering the temperature or humidity to verify that the alarm function is actually working according to your specifications and have that test noted on the ThermaViewer display. So, if your procedures require an alarm test every month you will see a set of Ts on the display flanking the rising and/or falling chart caused by changing temperatures during the test.

AC Disconnect Alarm – This is enabled by default so that the buzzer will sound and the relay will close anytime the AC power is disconnected. If you have an auto dialer attached to the ThermaViewer you will get a phone call any time the power fails. The buzzer will sound as an intermittent beeping for several minutes and then stop. If the power still has not been restored after two hours the buzzer and relay will again be actuated.



## *TView Software Operation*

### *Downloading data*



Downloading data to a computer requires the PC interface cable. It connects the ThermaViewer to a 9 pin serial port of a computer. If the cable will not reach the computer from where the ThermaViewer display unit is positioned, the ThermaViewer can be unplugged and taken to the computer for the download. (Verify that the 9vdc battery is in place and charged before unplugging the power adaptor.)

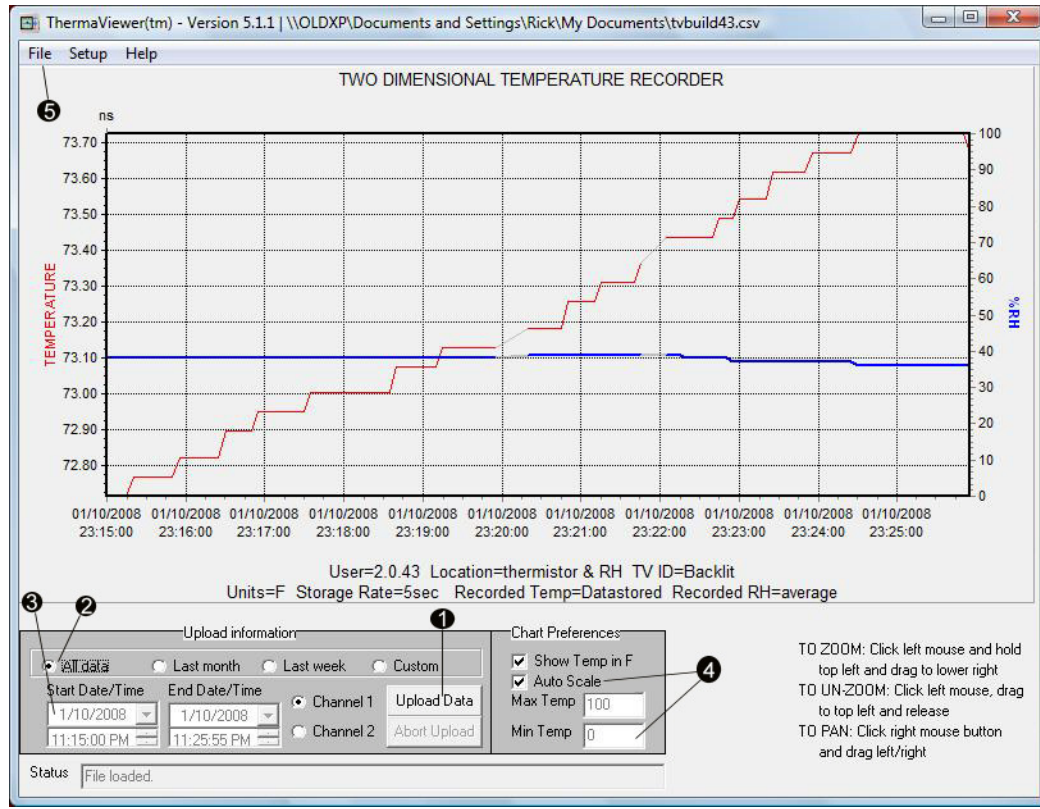
If your computer does not have a serial port you will need to use a serial to USB converter.

The downloading process requires the TView software program. This can be installed from the included CD or it can be downloaded from the Technical Support page on the 2DI web site <http://www.e2di.com>.

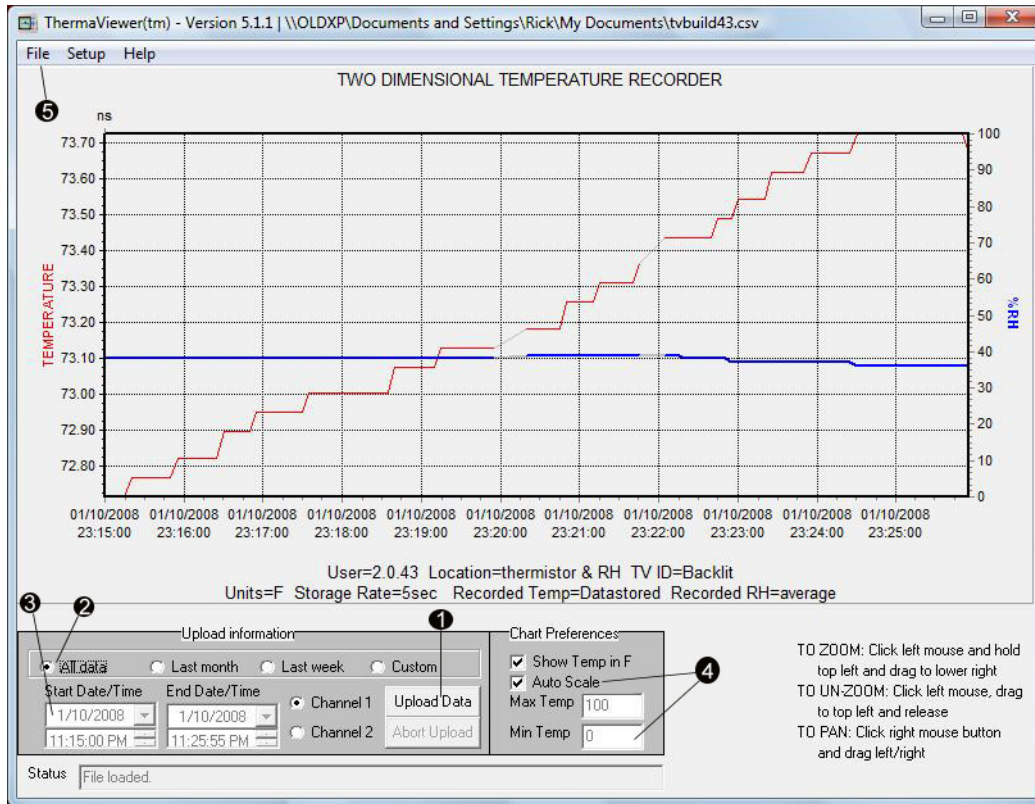


**Operational Tip:** *Once the software is installed on your computer it must be run from the directory in which it is installed the first time it is run. Do not create a shortcut pointing to a different directory to run the program the first time you run it.*

## TView Software



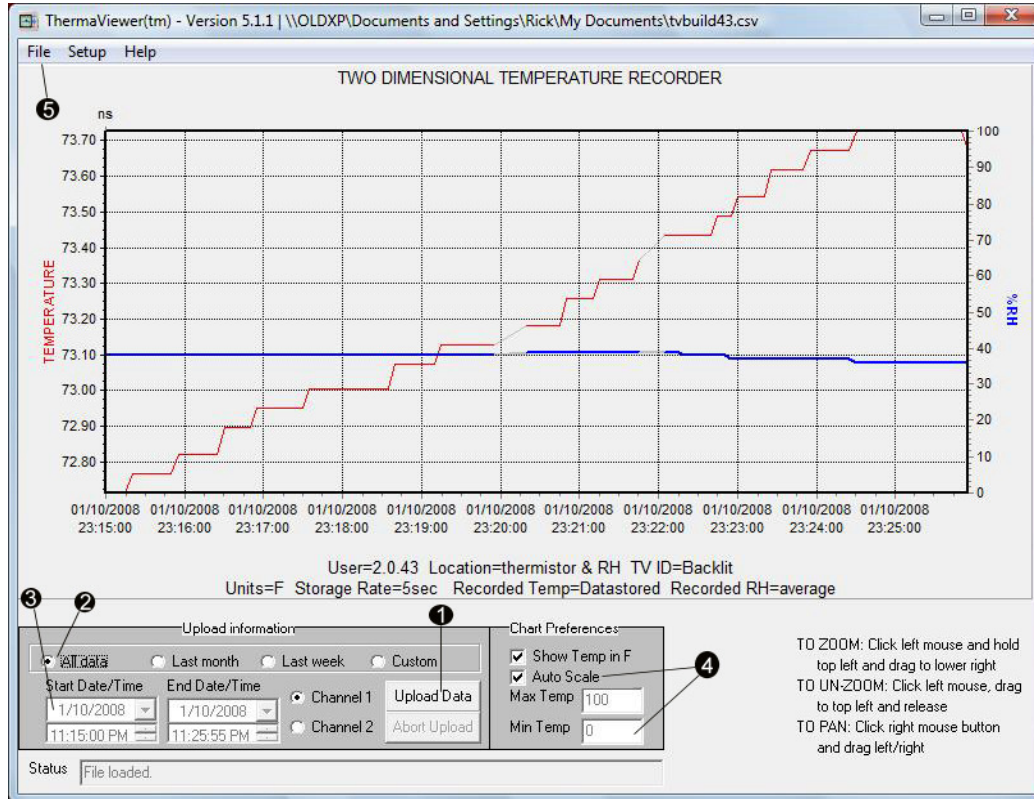
1. To copy data from the ThermoViewer click on the *Upload Data* button (#1 above). To upload the information collected from sensor #2 first click the Channel 2 button and then click the *Upload Data* button.
2. The autorange button is checked by default so that **all stored data** for the selected sensor will be uploaded to the PC and displayed.
3. Clicking on last month, last week, or custom and setting a date range (see 3 above) will cause only that data to be uploaded to the PC and displayed.
4. By default, the TView will scale the display so that the highest value uploaded will be at the top of the chart and the lowest value uploaded will define the bottom of the chart. If the *Auto Scale* button (#4 above) is unchecked, the chart will be redrawn with the Max and Min temperatures that appear in the temperature boxes as the upper and lower limits of the display. Each time this check box is checked or unchecked the temperature chart will be redrawn.



Once the chart has been downloaded to your computer the chart can be moved around or zoomed into to highlight a particular measurement with the computer's mouse.

To highlight a particular set of temperatures draw a box with the mouse. Position the cursor at the top left hand portion of the area you want to zoom into and while holding down the left mouse button draw a box toward the lower right hand corner. When the mouse button is released the chart will be rescaled to highlight the temperatures within the box. To return to a full chart draw a box from the lower right corner to the upper left corner and release.

## Drop-down menus



### 1. The 'File', 'Setup', and 'Help' menus:

#### a. File menu

- i. Data displayed on the monitor can be saved to a file on your computer by selecting "Save Chart". If the data is encrypted two files will be saved. One of them will be a CSV file that can be opened with Excel, Word or other program. The 2<sup>nd</sup> file will be an encrypted file that **cannot** be opened with any program other than the TView program.
- ii. A previously saved file can be loaded into the TView program for viewing by selecting "Load Chart".
- iii. A chart displayed on the computer monitor can be printed with "Print Chart". Only the data displayed on the computer screen will be printed. So if you have zoomed into just one day of temperature that is all that will be printed.



**Operational Tip:** Files are always saved as CSV files and may also be saved as encrypted files with a TVX extension (see ii security below). CSV files can be loaded into Excel, Word, Notepad, etc... and viewed as a table of data points. Files with the TVX extension can only be opened, viewed, and or printed with the TView program.



**b. Setup menu:**

- i. Port: The user selects the COM port to download through. i.e. Com1, Com2...Com8. (If a USB to serial converter is used, the converter software will reassign the USB port to a COM port). Insure that the correct COM port is selected so the TView program can see the ThermaViewer.
  - ii. Security: If the encrypted button is checked, the TView program will save an encrypted file with a TVX extension in addition to a CSV file when data is saved to disk. A file with the TVX extension cannot be read, written to, or printed except with the TView program. This insures that data **cannot** be changed once it is downloaded from the ThermaViewer and saved as a file. This satisfies the requirements for the 21 CFR 11 standard. An encrypted file **can only** be loaded into TView for viewing or printing.
  - iii. Auto Download: If the TView program is running on the PC it can automatically download data at user-specified intervals. This downloads data from both ports and writes the information to at least two different files on the computer. The file names are prefaced with the month and year of the download with a new file starting automatically at the beginning of each month.
  - iv. Date Format: The user can select the format for the date to match that used by his computer or country.
  - v. Edit user information: Header information is stored with downloaded data when it is saved as a file. This includes user name, location and ThermaViewer id.
- c. Help:** This menu gives access to a diagnostic mode for troubleshooting purposes, which displays the raw data as it is downloaded from the ThermaViewer. It is generally only used at the request of a 2di technician.



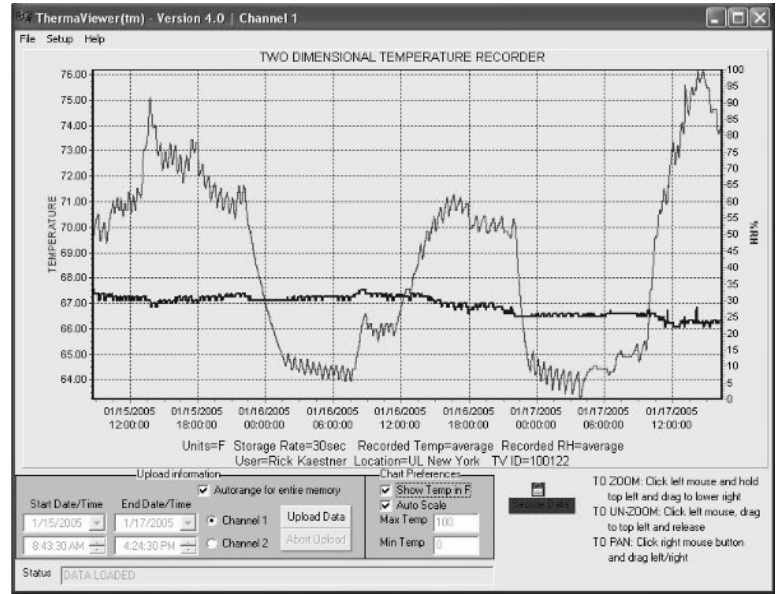
**Operational Tip:** *Set the date format under the 'setup' menu to agree with the date format being used by the computer for proper downloading.*



Microsoft Excel - tvdata12-15-03.txt

|    | A          | B       | C   | D           | E | F |
|----|------------|---------|-----|-------------|---|---|
| 1  | 10/16/2007 | 6:05:30 | AM, | 22.51753044 | C |   |
| 2  | 10/16/2007 | 6:05:45 | AM, | 22.58419609 | C |   |
| 3  | 10/16/2007 | 6:06:00 | AM, | 22.58419609 | C |   |
| 4  | 10/16/2007 | 6:06:15 | AM, | 22.68419647 | C |   |
| 5  | 10/16/2007 | 6:06:30 | AM, | 22.68419647 | C |   |
| 6  | 10/16/2007 | 6:06:45 | AM, | 22.55086327 | C |   |
| 7  | 10/16/2007 | 6:07:00 | AM, | 22.65086365 | C |   |
| 8  | 10/16/2007 | 6:07:15 | AM, | 22.68419647 | C |   |
| 9  | 10/16/2007 | 6:07:30 | AM, | 22.61752892 | C |   |
| 10 | 10/16/2007 | 6:07:45 | AM, | 22.55086327 | C |   |
| 11 | 10/16/2007 | 6:08:00 | AM, | 22.61752892 | C |   |
| 12 | 10/16/2007 | 6:08:15 | AM, | 22.38419724 | C |   |
| 13 | 10/16/2007 | 6:08:30 | AM, | 22.48419571 | C |   |
| 14 | 10/16/2007 | 6:08:45 | AM, | 22.48419571 | C |   |
| 15 | 10/16/2007 | 6:09:00 | AM, | 22.38419724 | C |   |
| 16 | 10/16/2007 | 6:09:15 | AM, | 22.31752968 | C |   |
| 17 | 10/16/2007 | 6:09:30 | AM, | 22.28419685 | C |   |
| 18 | 10/16/2007 | 6:09:45 | AM, | 22.31752968 | C |   |
| 19 | 10/16/2007 | 6:10:00 | AM, | 22.41753006 | C |   |

Temperature data displayed in Excel



Temperature and Humidity displayed in TView



**Note to International Customers:** If you save your chart it will be saved in a US format. (i.e. Number separators will be 'period' for a decimal point and a 'comma' for the 1000s separators). To import your file into 'Excel' you should use the "Import text file" under 'Get External Data' under the data menu of Excel and change the number format under 'advanced' in the import wizard. For more information see: <http://office.microsoft.com/en-us/assistance/HA010552851033.aspx>.



## FAQ

1. Can I tell if an alarm was triggered by looking at the display?
  - a. Yes – If an alarm was triggered a large “A” is placed on the chart at the time the alarm began and a small “a” at the time the alarm was silenced or expired.
2. Can alarms be triggered during the test mode?
  - a. Yes – The purpose of the test mode is to demonstrate that the alarms are working correctly. When a test mode begins, a large “T” is placed on the chart of the sensor being tested. A small “t” appears when the test concludes. If an alarm was triggered while in Test Mode the T t set will bracket the A and a of the alarm indication.
3. Is there a calibration procedure available?
  - a. Yes – the calibration procedure can be downloaded from our web site or from the DVD that came with your ThermaViewer, so that your metrology department or outside calibration service can characterize any sensor.
4. What do the Zoom-out and Zoom-in buttons do?
  - a. The amount of data displayed in the chart on the ThermaViewer display unit differs according to the Zoom setting. A data point is plotted in each column if the chart is zoomed in completely (Zoom =1X).
  - b. The ‘**ZOOM-OUT**’ key causes more than one data points to appear in each column. The data on the LCD can be zoomed out 10 times (Zoom =10X). This means that the user can see between 4 months and 256 years on one chart depending on how often the sensor is collecting data. **In any zoomed-out mode more than one collected measurement appears in each column.** The recorded measurements are displayed as a high-low vertical bar.
    1. So, for example, if the ThermaViewer is set to Zoom=2X then each column will show two measurements connected with a vertical line whose top is the higher temperature and whose bottom is the lower temperature.
    2. Further, if the chart is zoomed out to Zoom = 6X, the measurements (in this case all 32 of them) will appear as a single vertical high-low line with the highest of the 32 temperatures being the top of the line and the lowest of the 32 temperatures as the bottom of the line. The ThermaViewer can display between 1 and 512 measurements in each column. The **ZOOM-OUT** button can be pressed ten times (Zoom=10X) to show the maximum amount of data. This method of displaying multiple measurements in the same column allows the ThermaViewer to display a very large amount of data in the same way that stock prices are displayed with high-low bars covering each hour of an eight hour trading day.



5. How long can the sensor wire be?
  - a. The sensor wire can easily be lengthened by 200 feet or more without sacrificing accuracy. If an extension cable is added to the sensor cable that is inside a freezer it should be coupled with a straight through connector to the supplied cable, positioning the supplied black sensor cable in the refrigerator or freezer. The black sensor cable is built to withstand temperatures down to  $-20^{\circ}\text{F}$ , whereas the wire used for an extension cable will oxidize over time in low temperatures.
6. Can I extend the wire to the sensor?
  - a. You can make your own extension cable using Silver Satin eight-conductor phone cable with an RJ45 connector on each end. This cable is un-twisted cable. Avoid using twisted pair cable, such as Cat 5 cable, which can cause the sensor to lose accuracy.
7. Can I change the date and time without losing saved data?
  - a. If you are move the date or time backwards, old data will be cleared (You will be given a warning before any data is actually cleared). You can move the time forward 1 hour or less without losing data. If you move the time forward more than one hour the old data will be cleared.
8. Error message when loading a downloaded data file into Excel
  - a. When you open a file in Excel that has been saved from the ThermaViewer with more than 65000 data points, Excel will only load the first 65000 data points. (This is a limitation of the Excel program). You can load the downloaded file in a text editor and split it into two files to get a numeric list of all the data points. The TView program, of course, has no such limitation and will display all data in the file.





## Warranty

The ThermaViewer line of instruments is warranted by the manufacturer to be free from defects in material and workmanship for a period of twelve months after delivery. In the event of a claim under this warranty, the product or part must be returned to the factory for repair or replacement (shipping prepaid) with a Return Authorization Number. It will be repaired or replaced at the factory's option without charge to the user. Any freight charges incurred may, at the factories option, be passed on to the user.

This warranty does not cover routine calibration or battery replacement. The forgoing warranty and remedy are exclusive and in lieu of all other warranties either expressed or implied.

The manufacturer shall under no circumstances, be liable for consequential or incidental damages resulting from failure or malfunction of its products. The manufacturer makes no warranty for products not manufactured by itself or for any products modified by the buyer or subjected to misuse or neglect.

Under no circumstances shall the manufacturer be liable for consequential or incidental damages to any other products or inventory as the result of the use or misuse of its products.



## ***FCC and CE Mark Verifications***

**This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.**

**This equipment conforms with the Australian and New Zealand EMC requirement for generic products to be used in residential, commercial and light industrial environments. AS/NZS 4251.1.1:1999 (AUS/NZ Class B verified)**

**This equipment is CE mark-Verified as Class B using EN 61326:1997 +A1:1998 + A2:2001, EN61000-3-2:200 Class A and EN 61000-3-3:1995 +A1:23001 standards.**

**Declarations of Conformity and Certificates of compliance can be download from our web site at: <http://www.e2di.com/doc.htm>**

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